



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/046,121	03/20/1998	BARBARA A. HALL	EN998028	1830

7590 03/25/2002

KEVIN P RADIGAN
HESLIN & ROTHENBERG
5 COLUMBIA CIRCLE
ALBANY, NY 122035160

EXAMINER

WONG, ALLEN C

ART UNIT PAPER NUMBER

2613

DATE MAILED: 03/25/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

16

Office Action Summary

Application No.

09/046,121

Applicant(s)

HALL ET AL.

Examiner

Allen Wong

Art Unit

2613

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 February 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 and 12-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 6, 8, 10, 14, 19, 27, 29 and 30 is/are allowed.
- 6) ☒ Claim(s) 1-5, 7, 9, 12, 13, 15-18, 20-26, 28, 31-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Response to Arguments

1. As for the 35 U.S.C. 103(a) rejection made on 11/7/01, the Park reference was not used because the examiner did not intend to use the Park reference to reject claims 1-5, 7, 9, 12, 13, 15-18, 20-26, 28 and 31-38. The examiner apologizes to the applicant for making the typographical error. Clearly, if one peruses the Office Action dated 11/7/01, the examiner did not use Park at all because the examiner had not intended to use Park at all. The rejection should be based on the combination of Uz and Flannagan.
2. Applicant's arguments filed 2/21/02 have been fully read and considered but they are not persuasive.
3. Regarding pages 26-29 of applicant's remarks, applicant mentions that Uz does not disclose the encoding of a frame having a random noise portion and a normal video portion. The examiner respectfully disagrees. The examiner's citation of Uz, column 3, lines 25-27 states that the use of frame coding is typically preferred when the video scene contains "significant detail" or significantly contrasted complexity. In other words, Uz discloses that in a frame, it is clear that there is some complexity or an implication of random noise within these frames. Further, Uz teaches that the use bit budgeting for each frame is dependent on the complexity measure for each section of the frame, as disclosed in column 4, lines 34-37. The suggestion is that the complexity of a frame determines the use of "frame coding" or intra-frame coding is proper because of the significant detail of the video scene. Bit budgeting is affected because as the picture

detail increases, the more bits are needed to encode the scene to accurately present a high quality representation of the video scene.

4. Regarding lines 15-16 on page 29 of applicant's remarks, applicant states that Uz does not disclose the allocation of bits to the less noisy area (normal video portion) of a frame and reducing the allocation of bits to the highly complex image area. If the "normal video portion" requires more bits for allocation than the "highly complex image area", that would mean that the "normal video portion" would contain more significant detail or complexity than the applicant's "highly complex image area". Uz does disclose the encoding of the frame with the most significant detail (col.4, lines 34-37). If one does not allocate the proper amount of bits to the image with the significant picture detail during the encoding process, then of course, the image would lose some, if not, all of the significant picture detail. Clearly, Uz teaches the concepts of encoding based on the complexity of a frame. Also, Uz discloses that the use of frame coding is typically preferred when the video scene contains "significant detail" or significantly contrasted complexity (col.3, lines 25-27).

5. With regards to lines 28-29 on page 29 of applicant's remarks, applicant contends that Uz does not teach the limitation of biasing the coding of highly complex macroblocks towards predictive coding. The examiner respectfully disagrees. Uz does teach or suggest that the use of inter-coding (ie. predictive coding) is in fact deterring the use of intra-coding (column 9, lines 10-12). Uz states that the technique applied to the decision of encoding of the macroblocks is "biased against intra-coding", meaning the deterrence of intra-coding of the highly complex macroblocks.

Regarding 1st full paragraph on page 30 of applicant's remarks, applicant argues that the calculation of the activity levels is fundamentally different. The examiner respectfully disagrees. The activity level calculation is taught by Uz, as disclosed in column 4, lines 39-42 and column 8, lines 27-35. Evidently, there is no fundamental difference between Uz's activity level calculation and the applicants' activity calculation because both pertain to the activity level in macroblocks.

Regarding pages 30-34 of applicant's remarks, applicant discusses that Flannaghan's teachings are not relevant to the applicant's present invention. The examiner respectfully disagrees. The Flannaghan reference is primarily used for reinforcing the teachings of Uz. Flannaghan discloses the determination of noise in frames, as disclosed in col.3, lines 3-10. The erroneous frame difference value is the noisy portion of a frame, and as any one of ordinary skilled in the art would acknowledge that frames are comprised of macroblocks. As mentioned before, the intra-coding of a highly complex portion of a frame is taught in Uz. Uz discloses that the use of frame coding is typically preferred when the video scene contains "significant detail" or significantly contrasted complexity (col.3, lines 25-27). For further explanation, please see the above paragraphs and the rejection below.

Regarding page 34-35 of applicant's remarks about claim 7, applicant states that Uz fails to disclose the biased predictive coding of the random noisy portion. Uz does teach or suggest that the use of inter-coding (ie. predictive coding) is in fact deterring the use of intra-coding (column 9, lines 10-12). Uz states that the technique applied to the decision of encoding of the macroblocks is "biased against intra-coding", meaning

the deterrence of intra-coding of the highly complex macroblocks (random noisy portion).

Regarding page 35 of applicant's remarks about claim 9, applicant mentions that the determination of the adjusted quantization level is not disclosed. Please see the rejection below. Note that Uz's column 12, lines 50-53 discloses the limitation of determining the adjusted quantization level.

With regards to page 35 of applicant's remarks about claims 12 & 13, applicant asserts that the complexity disclosed in Uz is different from the complexity measure disclosed in the present invention. The examiner respectfully disagrees. The complexity measure disclosed in Uz is in fact equivalent to the applicant's complexity measure since both pertain to the "frame complexity" and it is well known to one of ordinary skilled that a frame is comprised of macroblocks, and a macroblock is comprised of pixels.

Regarding page 36-37 of applicant's remarks about claim 26, applicant mentions that the examiner stated that Uz does not teach the determination of an activity level. The examiner respectfully disagrees. The examiner did point out that the determination of an activity level in the rejection below as well as the above paragraphs. Moreover, applicant mentions that the obviousness has not been established. As stated before, Uz teaches the determination of an activity level (col.8, lines 27-35). Uz fails to disclose the comparison of a minimum activity level of said order with a next to minimum activity level of said order to derive said activity level for said macroblock. It would have been obvious to one of ordinary skill in the art to compare the minimum activity level of said

order with a next to minimum activity level of said order to derive said activity level for said macroblock for efficiently encoding the image data while maintaining high quality.

Also, applicant states that Uz teaches away from both the use of information exclusively within the macroblock and the "use of a value other than the minimum as an activity level for the macroblock". The examiner respectfully disagrees. First, Uz does teach the use of information within the macroblock since a macroblock is comprised of pixels, as one of ordinary skilled would acknowledge. Second, applicant discloses that Uz always uses the minimum value calculated from blocks within and surrounding the macroblock as the value of the macroblock. Can Uz's system have a minimum value without the ordering of values (ie. without the prioritization of the block values)? It cannot have a minimum value. In other words, Uz must have the block values ordered or prioritized at some point so that one can determine the minimum value. Otherwise the minimum value would not be obtainable without the ordering of values. The values would be indistinguishable without order.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-5, 7, 9, 12, 13, 15-18, 20-26, 28 and 31-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uz (5,682,204) in view of Flannaghan (4,703,358).

Regarding claim 1, Uz discloses a method for encoding a frame, comprising:
using intra-frame statistics to determine without reference to another frame whether said frame includes a random noise portion and a normal video portion (col.3, lines 25-27; note intra-frame encoding is used and note Uz discloses "significant detail" is determined in a video frame, thus statistics are gathered from the intra-frame encoding process; also, the frame has the normal video portion along with the portion with significant detail, ie. random noise portion), and if so, then for each macroblock of said frame:

(i) determining a macroblock activity level (col.8, lines 27-35; an activity level is measured which is the same as the determination of an activity level);

(ii) determining when said macroblock activity level exceeds a predefined threshold (see figure 3; note that a threshold is set and a determination means must exist to determine when the activity threshold is passed so that a course of action will be taken due to the determination of whether the macroblock activity level exceeds a predefined threshold), wherein said macroblock activity level exceeding said predefined threshold indicates that said macroblock is associated with said random noise portion of said frame; and

(iii) adjusting encoding of said macroblock when said macroblock activity level exceeds said predefined threshold to conserve bits used in encoding said macroblock (see figure 3; note that if a threshold is exceeded, then intercoding is used which thereby reduces the bit-rate and conserve bits used in encoding said macroblock) by

biasing coding of said macroblock associated with said noisy portion of said frame towards predictive coding (col.9, lines 4-12, lines 36-43; please note that Uz does teach the biased coding of macroblocks towards "inter-coding" or predictive coding, thus this "bias" is used to encode macroblocks towards predictive coding) and thereby save bits otherwise used to encode said random noise portion of said frame and provide a more constant picture quality due to encoding of the frame.

Although Uz may not appear to mention the limitation of "determining whether said frame includes a noisy portion, and if so, then for each macroblock of said frame", Flannaghan teaches the determination of noise in frames (col.3, lines 3-10; note that the erroneous frame difference value is the noisy portion of a frame, and of course, as any one of ordinary skilled would know that frames are comprised of macroblocks). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Uz and Flannaghan for noise reduction and adaptive encoding so as to provide accurate, efficient encoding schemes for producing high quality images.

Note claims 2, 3, 17, 24, 25, 31, 37 and 38 have similar corresponding elements.

As for claims 7 and 28, Uz discloses motion estimation process done on said macroblock (col.11, lines 20-26).

Regarding claims 9, 22-23 and 35-36, Uz discloses the determination of adjusted quantization level for use in encoding a macroblock (col.12, lines 50-53).

Regarding claims 4, 18 and 32, Uz discloses the comparison of "total activity of a frame macroblock" (col.5, lines 62-63). However, Uz fails to disclose the comparison of

a minimum activity level of said order with a next to minimum activity level of said order to derive said activity level for said macroblock as disclosed by the applicant.

Therefore, it would have been obvious to one of ordinary skill in the art to compare the minimum activity level of said order with a next to minimum activity level of said order to derive said activity level for said macroblock for encoding accuracy and efficiency.

Regarding claim 5, Uz does disclose the calculation of average activity (col.11, lines 12-13) in frame macroblocks. However, Uz fails to teach the comparison of a minimum activity level with an average activity level in said multiple blocks of said macroblock. Therefore, one of ordinary skill in the art would obviously do a comparison of a minimum activity level with an average activity level in said multiple blocks of said macroblock for improving encoding accuracy and efficiency.

As for claims 12 and 13, Uz discloses a measure of a frame complexity value (col.12, lines 60-64). However, Uz fails to teach the calculation of a complexity threshold and the comparison of said frame complexity value. Therefore, it would have been obvious to one of ordinary skill in the art to calculate a complexity threshold from a group of frames, since an activity threshold can be calculated, and a comparison of complexity values is obvious to do from a group of complexity values for improving encoding accuracy and speed.

As for claims 15, 16, 20 and 33, one of ordinary skilled in the art would obviously recognize that all digital devices require the flagging of ones and zeroes since digital logic dictates the well known use of a binary system in digital communications.

Regarding claim 26, Uz does teach the determination of an activity level (col.8,

lines 27-35; the measure of an activity level is the determination of an activity level). However, Uz fails to disclose the comparison of a minimum activity level of said order with a next to minimum activity level of said order to derive said activity level for said macroblock as disclosed by the applicant. Therefore, it would have been obvious to one of ordinary skill in the art to compare the minimum activity level of said order with a next to minimum activity level of said order to derive said activity level for said macroblock for encoding accuracy and efficiency.

Note claims 21 and 34 have similar corresponding elements.

Allowable Subject Matter

Claims 6, 8, 10, 14, 19, 27, 29 and 30 are allowed over the prior art.

The following is a statement of reasons for the indication of allowable subject matter: the applicant incorporated the allowable subject matter into an independent form along with the intervening claim limitations. The combination of limitations in the independent claims 6, 8, 10, 14, 19, 27 and 29 were not taught in the prior art and are patentable.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen Wong whose telephone number is (703) 306-5978. The examiner can normally be reached on Mondays to Thursdays from 8am-6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christopher Kelley can be reached on (703) 305-4856. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.

Allen Wong
Examiner
Art Unit 2613



CHRIS KELLEY
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600

Application/Control Number: 09/046,121
Art Unit: 2613

Page 12

AW
March 21, 2002